Trinidad's pitch lake.

Narrow gauge road on bamboo ties.

Trinidad's Lake—on Which Men May Walk

Digging Out the Material for the City's Smooth Boulevarding a Task of Color and Beauty Set Among Isle's Tropical Foliage

By FRANK DORRANCE HOPLEY

IMAGINE a lake that is solid! Think of a lake over which a railroad runs with no other support than the ties! Dream of a lake on which men may walk without sinking into its depths and becoming engulfed! If you can do this, you are ready to take a fanciful trip, no, not to the world of make-believe, but to a most interesting part of this hemisphere, the West Indies.

Perhaps the most prosaic work in the world is laying a city pavement. To the average citizen it means discomfort, and the closing of the street for a time. Clouds of sooty smoke from the fire-wagon, sticky shoes if one is not careful, and a huge roller rumbling along which one has to dodge, no chance for imagination, nothing but stolid, dirty work. And yet, the place from which the asphalt comes, which is used to make the pavement, is one of tropical beauty, with its brightly hued flowers, and gayly colored butterflies and birds, and, most wonderful of all, its great, brown-gray lake of pitch.

It is on the island of Trinidad, a British possession, which lies just off the coast of Venezuela, that this world wonder is to be found. How it originated, how long it has been there, and how deep it is, are all matters of speculation.

The island, with its three green hills, which suggested to Columbus the name he bestowed upon it when he discovered it in 1498, basking in the sunshine and the lazy tropical air, with the music of the soft whirr of the wings of the humming birds, would seem to be the very place where dreams are born. One of the dreams, or legends, is that of how the asphalt lake came into existence. This has been handed down the centuries, among the natives of the island.

Long, long ago, they tell us, before Columbus sailed the seas, the island was inhabited by the Carib Indians. At that time, more so than at present, the island abounded with humming birds of many different hues. These birds the Indians believed to be the spirits of their departed dead, who had returned in that guise to protect the living. They reverenced the birds, and not one of them was ever hurt or killed by an inhabitant of the island.

Then there came upon the scene a fierce tribe of Indians called the Chaymas who cared not for the superstitions of their neighbors. They made their village upon a hill overlooking the sea, and at once began to kill the humming birds in large numbers for their bright colored feathers with which they adorned themselves.

But this sacrilege could not go unpunished, the Caribs tell us. The Great Spirit who rules the happy hunting grounds of departed Indians took swift vengeance. One morning the village on the top of the hill had disappeared, and in its place was a vast, molten lake of pitch, which boiled and seethed as if heated by supernatural fires. It took a century for it to cool, so the story goes, and the lake stands today as a perpetual warning to those who would harm the humming birds.

The geologists, however, have a different story to tell.

The asphalt lake, as it is called, is in the depression or crater of an old mud spring or volcano. Here, they say, ages ago, petroleum oozed up from the depths, passing in its course through strata of extremely fine mineral matter, clay and sand, with which it became intimately mixed. Natural gas helped along this movement, and caused the emulsion of oil and clay to be churned until when it reached the surface it formed the material which today is designated as "asphalt."

That at one time the lake overflowed is reasonably certain, for deposits of the pitch have been found along the side of the hill at some distance from the lake itself. Probably, however, some of this material may have burst through the crust of the earth at some point of least resistance, and was hardened upon coming in contact with the air. This material is called "land asphalt" to distinguish it from that found in the lake, and is of inferior quality, being more weathered than that found in the original deposit.

The lake, even today, is in constant motion. Not the seething and boiling which probably characterized it at its birth, but there is a very slow, gradual movement, caused by the evolution of gas, which still continues. Through patches of rain water in small depressions in the lake, may be seen gas bubbles rising at frequent intervals. This continual movement of the lake is one of its wonders.

In area, the lake covers some 114 acres, and borings to a depth of 175 feet have been made at various distances from the center, at which depth the same quality of asphalt was found to exist as that at the surface. To bore deeper was impossible owing to the fact that the drill was bent and broken by the pressure and movement of the pitch against it at that depth.

Top—Uncovering land asphalt near Trinidad Lake.
Bottom—Dumping skip filled with asphalt into hold of vessel.

To those of a scientific turn of mind, who want to know the actual composition of the asphalt, analyses made of samples taken from many parts of the lake, have showed it to be a material of great uniformity, and composed of water, bitumen, fine silica and colloidal clay. This colloidal clay is the most wonderful part of the asphalt. It is so fine, estimated at smaller than .0001 m. m., a micron, or .000,039,37 inches in diameter, and so intimately dispersed through the bitumen, that it does not settle out, and cannot be seen in solution even under a microscope. A special attachment called the ultra-microscope has to be used, which reveals particles of sub-microscopic size. Looked at under this attachment the clay particles are never still, but are always in an active state of motion, darting from side to side with unceasing energy, with what is called by chemists the Brownman movement. It is this colloidal clay, with its enormous surface energy, that gives to the asphalt its binding qualities and durability, when used in a street pavement.

Imagine now a railroad running over the wide expanse of asphalt. Yet that is just what actually does occur. It is a narrow gauge road and the tracks are laid on ties made of bamboo wood. It has open cars on which are huge buckets, or skips as they are called, which are filled with the asphalt. The cars are run by cable to a terminal station at one end of the lake. Because of the peculiar movement of the asphalt, the tracks are often thrown out of alignment, and they have to be straightened out before the cars can run on them again.

The asphalt is dug out of the lake with picks by native laborers, the majority of whom are the regular type of West Indian Negro. The asphalt comes out in large lumps like coal, and the worker places one of these lumps, weighing perhaps 30 or 40 pounds, upon his head, walks with it to the railroad track, and throws it into one of the skips on a car, without any apparent effort.

One of the strange things about this unique lake is that, when a hole is dug in it one day, and the asphalt taken out, by the next morning it is filled up again. Within two or three days no one would know that a hole had been made there. This filling up is caused by the settling of the entire mass of the asphalt, and not from any influx of new material, as was once believed. The pitch lake, as the asphalt deposit is called in Trinidad, came into being after centuries of slow formation—asphalt is not made in a day.

There has been taken from the lake, during the fifty or more years it has been worked, more than four million tons of asphalt, and there appears to be still an inexhaustible supply, as figured by the geologists, perhaps over a billion tons. In all the time of excavation the lake has settled only some fifteen feet from its original level.

When the skips of loaded asphalt reach the terminal station they are dumped into other skips, which are conveyed by an aerial cable to the shore, along a great steel pier, extending a quarter of a mile out into the ocean, where a steamship lies waiting to be loaded. Go out along the narrow boardwalk, climb up a winding stairway, and you come to a platform perhaps forty feet above the water. The conveyor cable is guided by pulleys around the end of the pier. As each bucket comes along, a clutch is thrown off, a couple of Negroes tip it up, and the asphalt goes tumbling through a hole in the platform, down a chute into the hold of the ship.

Then another strange phenomenon takes place. The asphalt after it has been in the hold a while, fuses together again into a solid mass, just as it was in the lake itself. During the voyage it becomes quite hard, and when its destination is reached, it has to be again dug out with picks, in the same manner as it was originally won from the pitch lake, many thousands of miles away.